TWENTY-EIGHT YEARS OF CONTAMINANT INVESTIGATIONS IN THE GREAT BASIN OF NEVADA AND VICINITY

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Abstract: Water birds nesting in association with the limited water resources (lakes, reservoirs, marshes and rivers) in the Great Basin have been investigated for contaminant-related problems since 1978. Two species, the black-crowned night-heron (*Nycticorax nycticorax*) and white-faced ibis (*Plegadis chihi*) had serious reproductive problems due to DDT and its principal metabolite DDE in the late 1970s; the reproductive problems have persisted into the 1990s for the ibis, but not the night-heron. Sources of the DDT/DDE for both migratory species was not the breeding grounds at Ruby Lake National Wildlife Refuge (NWR) and Carson Lake Wildlife Management Area, respectively. During the mid- to late 1980s, agricultural drainwater contaminants (selenium, mercury and boron) were investigated in the Lahontan Valley of Nevada (including Stillwater NWR). Selenium concentrations in waterbird eggs were generally low or background with less than 1% of the eggs above the lowest reported effect concentration for any species. Mercury was used to extract gold and silver from the Comstock Mining District (1859-1890) with much lost down the Carson River (estimated at 7,500 tons) which flowed into the Lahontan Valley including Lahontan Reservoir, Carson Lake and Stillwater NWR. The incidence of eggs collected in 1986-1988 with >3 ppm dry weight mercury (effect concentration) was 5.5% for ducks and 13.5% for other water birds, but egg concentrations fluctuated from year to year. Since the mid-1980s and up to 1990, cyanide in heap leach solutions and mill tailings ponds at gold mines in Nevada killed a large but incompletely documented number of wildlife (>9,500 individuals, primarily migratory birds). A field investigation in 1990 and 1991 documented the availability of cyanide (water concentrations reported) at a variety of "typical" Nevada gold mines, and discussed procedures for eliminating wildlife loss from cyanide poisoning. Mercury in the Carson River again brought us back to Nevada in 1997 when EPA requested us to determine if mercury from the historic mining area was still adversely affecting nesting birds at Lahontan Reservoir. Detailed nesting studies and sampling of eggs and blood have continued over the last 10 years with night-herons and snowy egrets (*Egretta thula*) at Lahontan Reservoir and at a reference site on the Humboldt River near Elko. Year-to-year changes in mercury exposure and annual effects were related to yearly water discharge in the Carson River. Also, annual changes in reproductive success and nesting population size were related to drought conditions during the middle years of the last decade. Another study in southeastern Idaho in 1985 and 1986 documented serious mortality of sage grouse (*Centrocercus urophasianus*) using agricultural fields in the late summer (with center-pivot irrigation systems). The grouse (usually successful hens with young) were attracted to the lush green vegetation (alfalfa and potatoes) that were sprayed with organophosphorus insecticides while they were in the fields.